Leveraging Web Content in Mac OS X Applications with WebKit

Session 200

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Leveraging Web Content in Mac OS X Applications with WebKit

Michael Lopp

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Lesson
Verse
Refrain
Chorus
Change Lesson
121
half speed
normal
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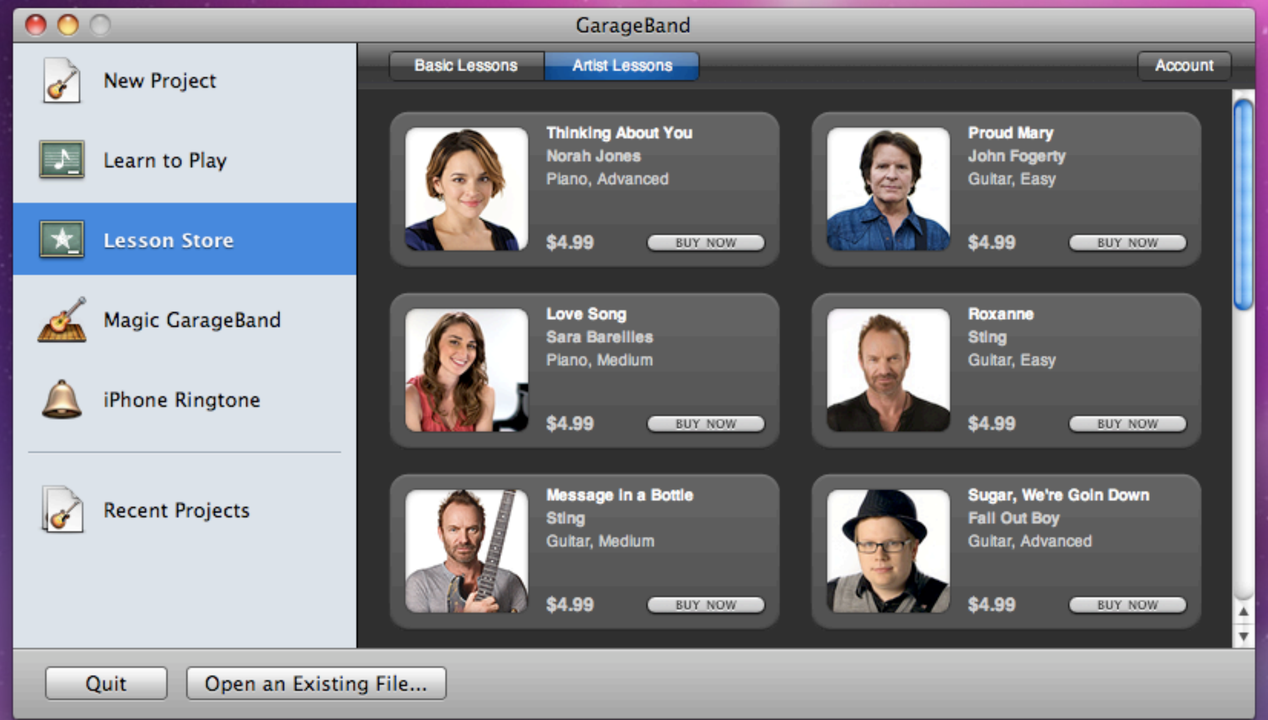
MacBook Pro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New Project
Learn to Play
Lesson Store
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Basic Lessons
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Norah Jones
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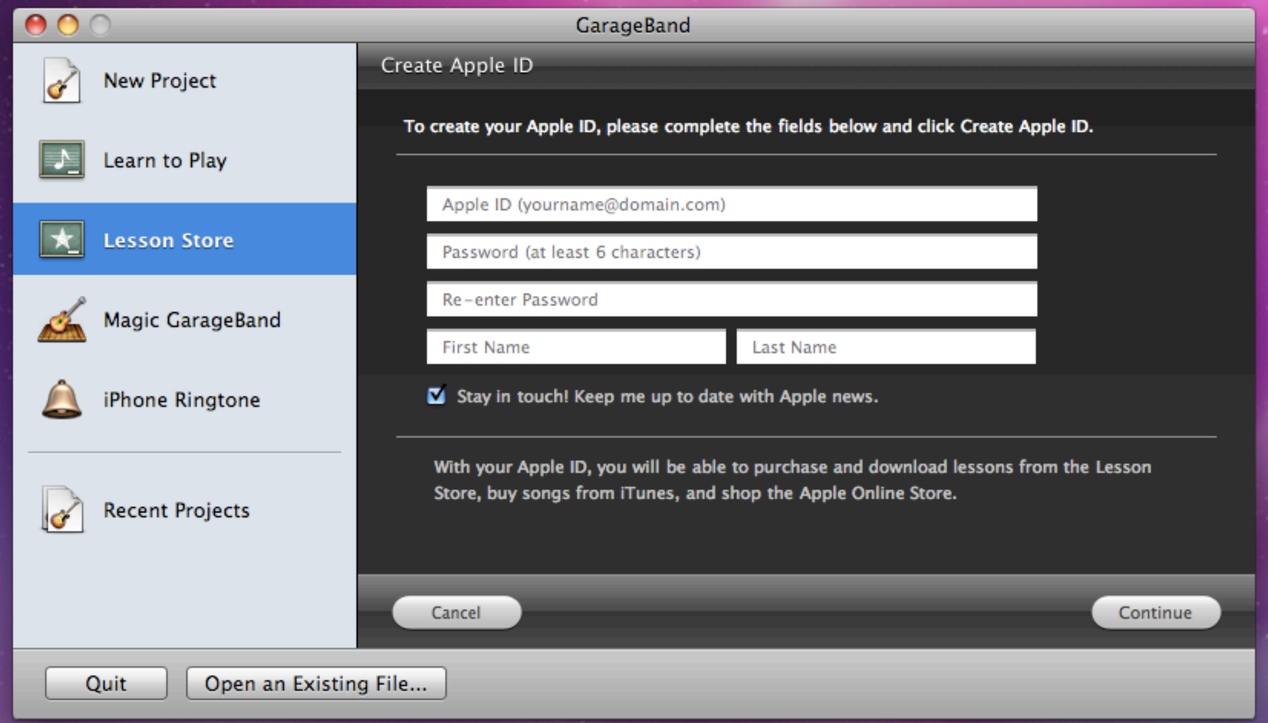
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To create your Apple ID, please complete the fields below and click Create Apple ID.
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Continue
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?

Overview

- Technical overview
- Building a hybrid app
- Rapid iteration via WebKit

Technical Overview

Tony Kinnis
Engineering Manager

We Will Cover…

- Why platforms are merging
- Power of WebKit
- Design considerations for hybrid applications

Why are we merging desktop and web platforms? And who cares?

We Want the Benefits of…

We Want the Benefits of…

- Interact with your local filesystem
- Communicate with peripherals
- Access to system information
- Function without an internet connection
- Interact with other applications

We Want the Benefits of…

We Want the Benefits of…

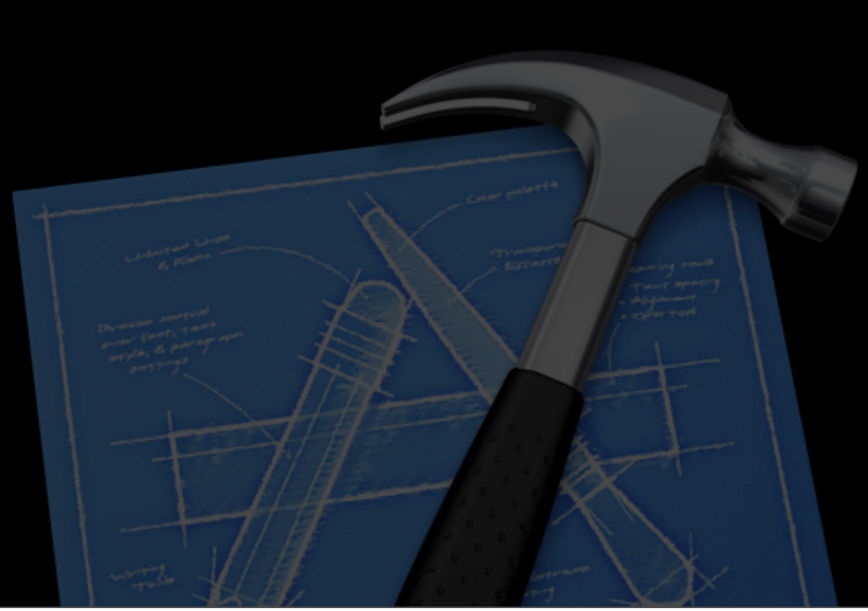
- html/css/javascript is great for dynamic and fluid content
- Seamlessly deploy changes to all of your users
- Mostly cross platform
- Short release cycles

We Want it All!

Hybrid Applications Can…

- Use local file system, peripherals, and system information
- Interact with other desktop applications
- Content is kept fresh
- New features without updates
- Commerce opportunities
- html/css/javascript for dynamic and fluid UI

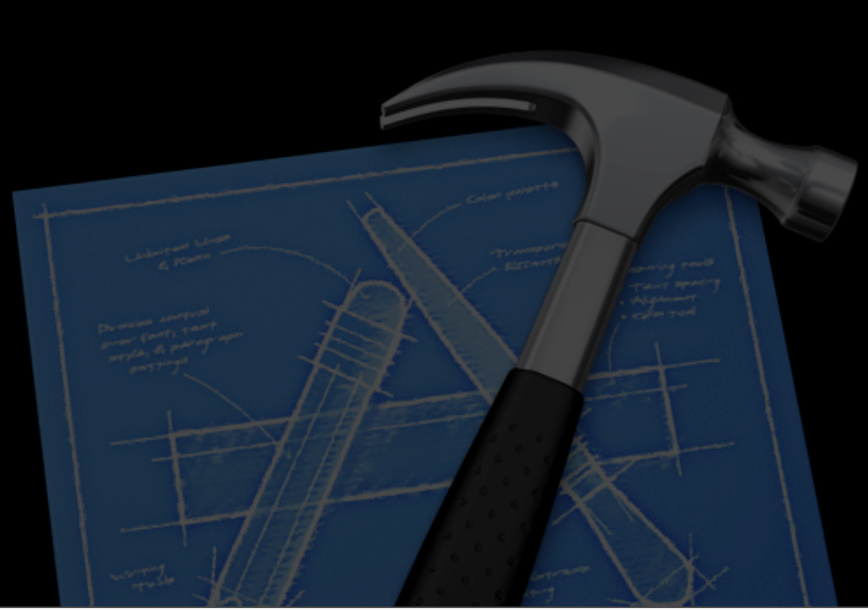
What can we do with WebKit and Objective-C?



WebKit Objective-C Features

Monitor activity

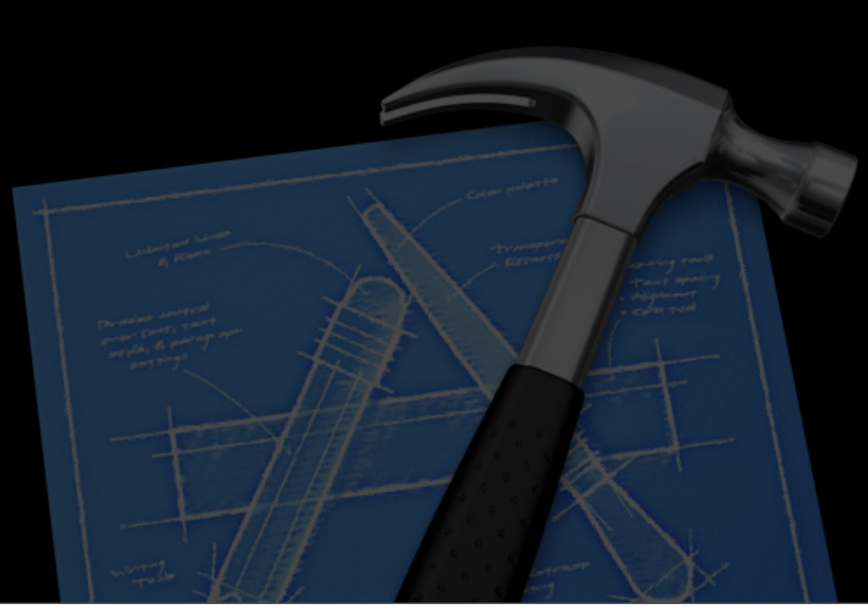
- Respond to new window requests
- Monitor page loading
- Monitor resource loading



WebKit Objective-C Features

Manage navigation

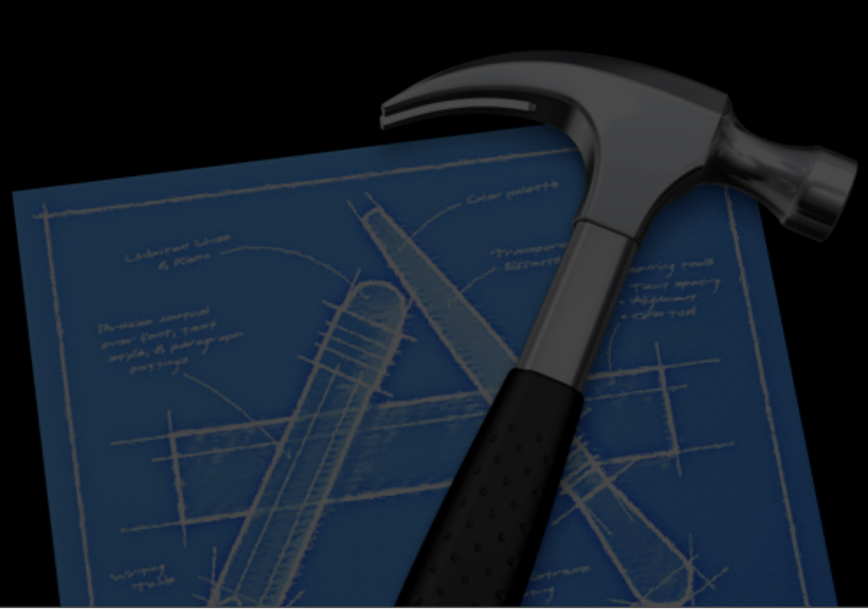
- Maintain a WebView's Back-Forward list
- Control paging back and forward
- Define page cache size and capacity
- Manage a user's browsing history
- Define policies that allow you to ignore specific URLs



WebKit Objective-C Features

Manage documents

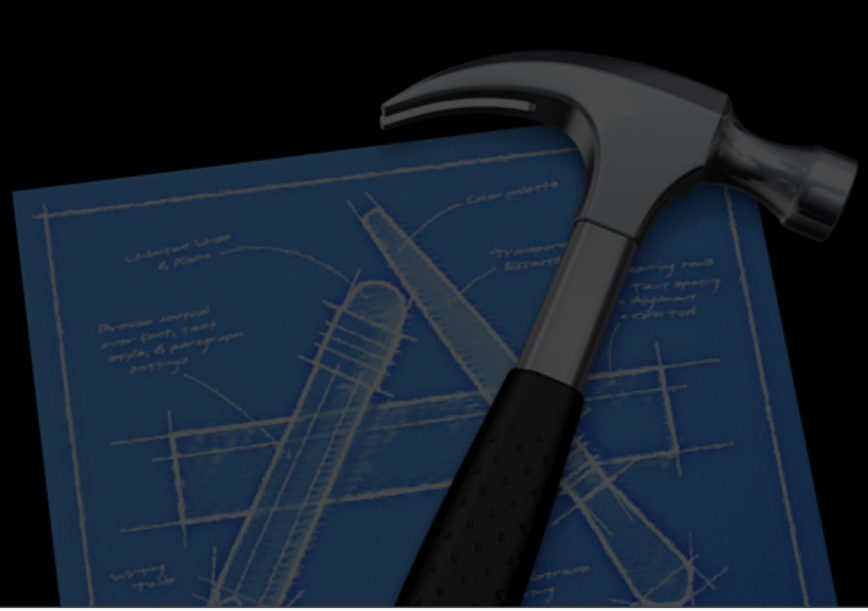
- Enable WebView content to be editable with support for undo
- Save and load html documents
- Programatically modify the DOM from Objective-C



WebKit Objective-C Features

Application cache and client-side state

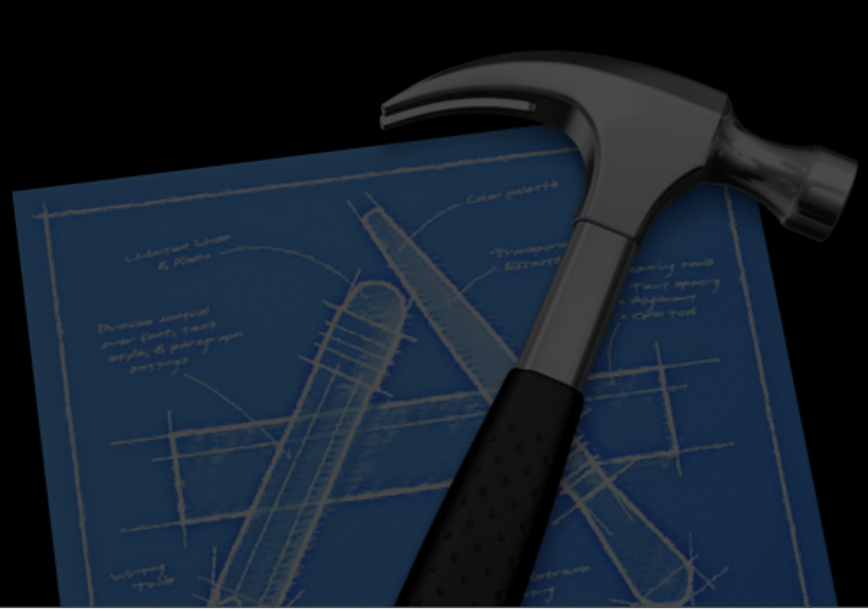
- Create a cache for offline applications
- Store data as key-value pairs in session or local storage
- Use a relational database via JavaScript



WebKit Objective-C Features

Bridge functionality

- Call JavaScript functions from Objective-C
- Call Objective-C functions from JavaScript



Design Considerations

- Minimize the need for users to take updates
- Maintain backward compatibility where possible
- Anticipate the future when designing interfaces
- Internet connectivity
- Reduce the number of baked-in URLs

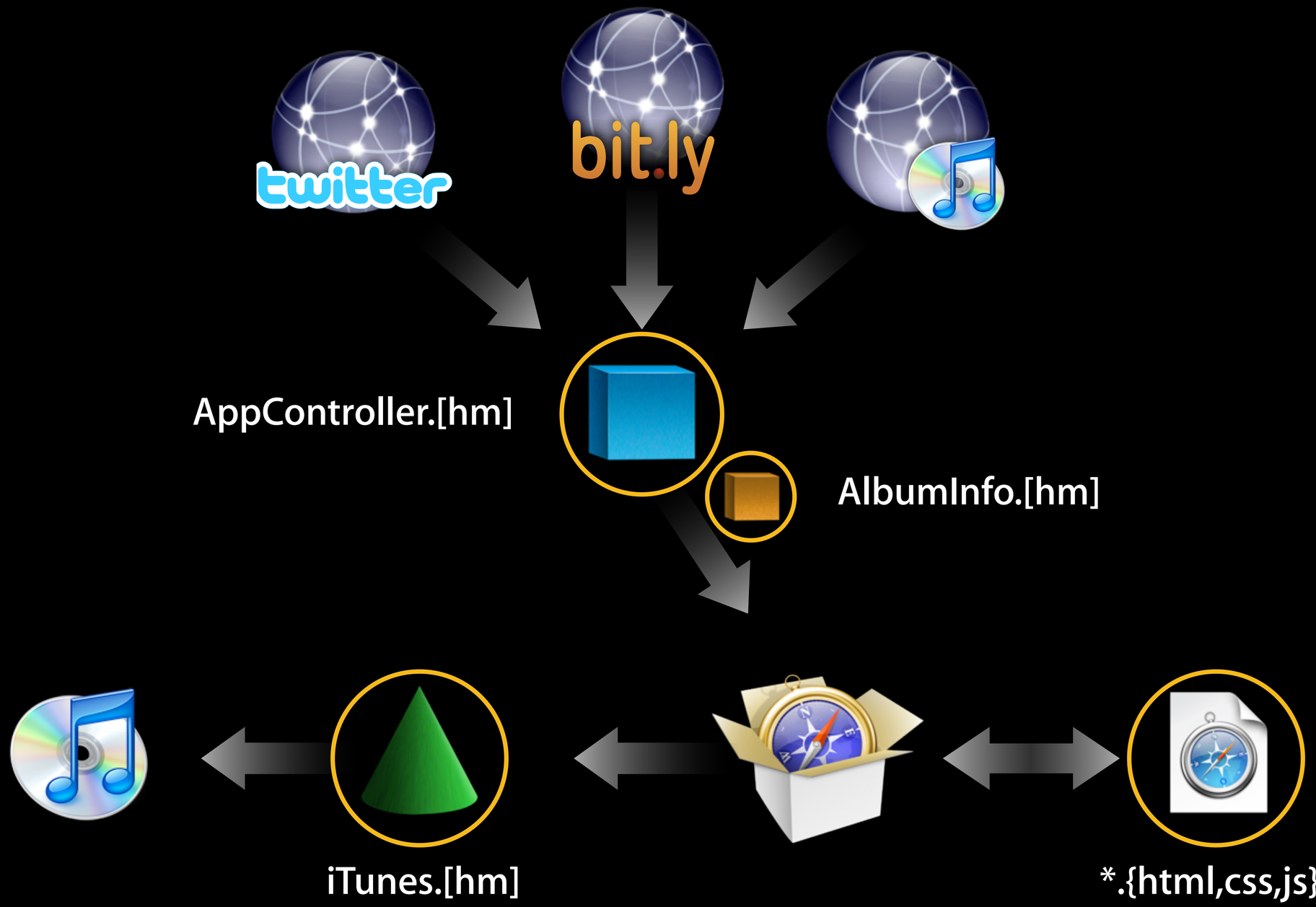
Building Hybrid Apps

Gregor Purdy
Engineer-at-Large

Building Hybrid Apps

- Demo
- Loading HTML into the WebView
- Passing Objective-C objects in to JavaScript
- Calling out from JavaScript to Objective-C

Demo


twitter
bit.ly
AppController.[hm]
AlbumInfo.[hm]
iTunes.[hm]
*.{html,css,js}

no. 2 graphite
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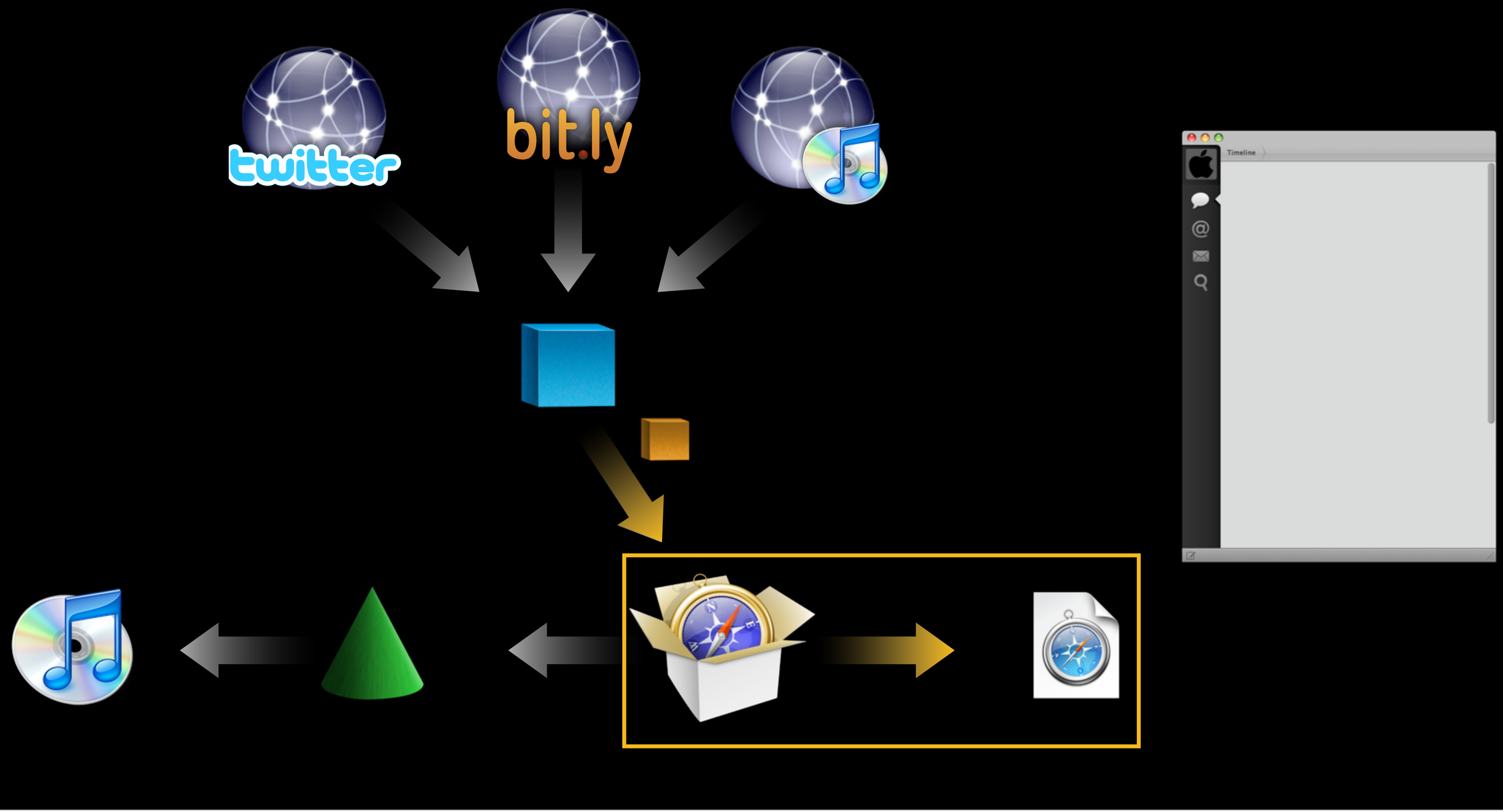
brush
ruler

Color palette
XCODE

Step 1—Load HTML in WebView

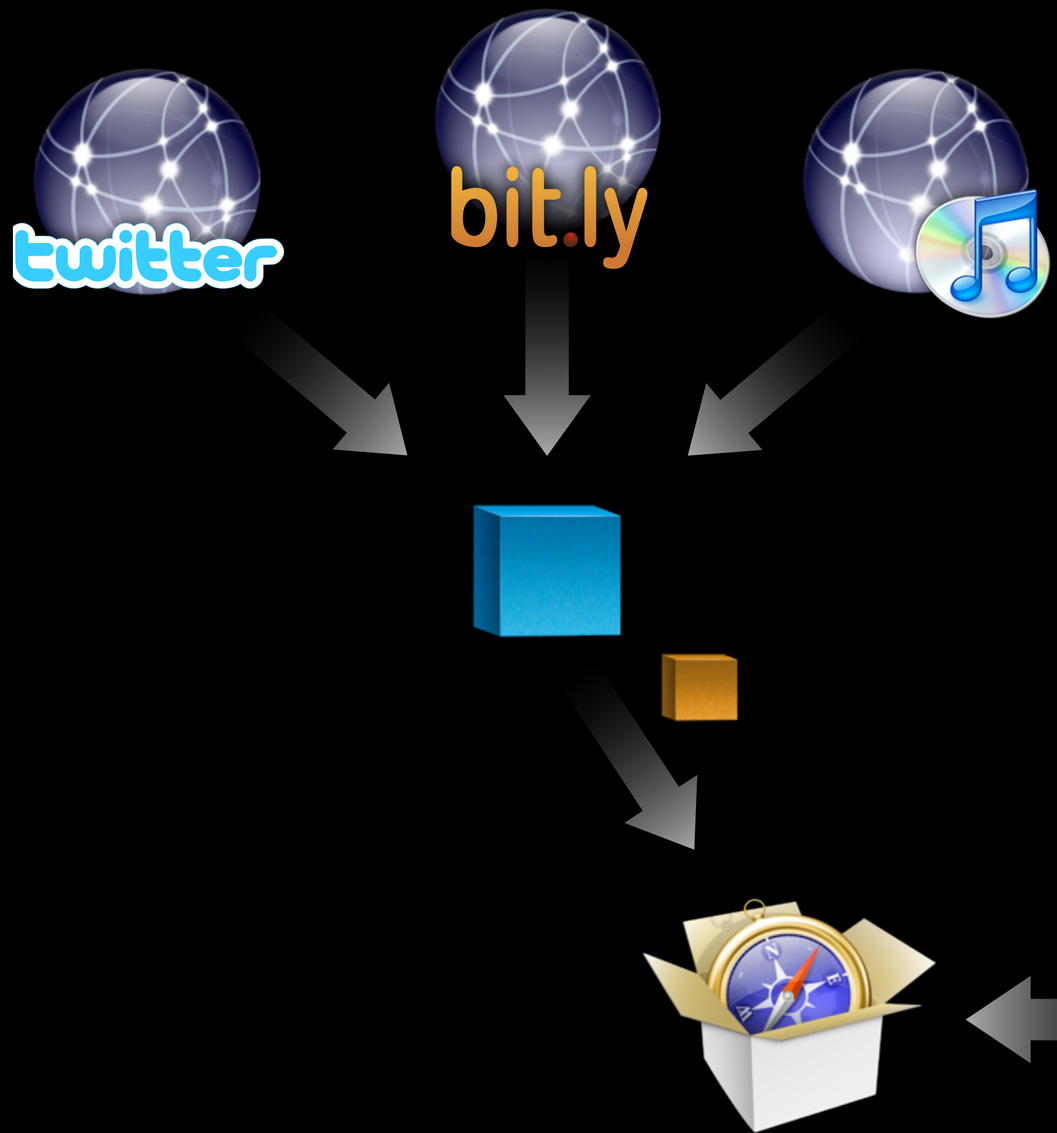


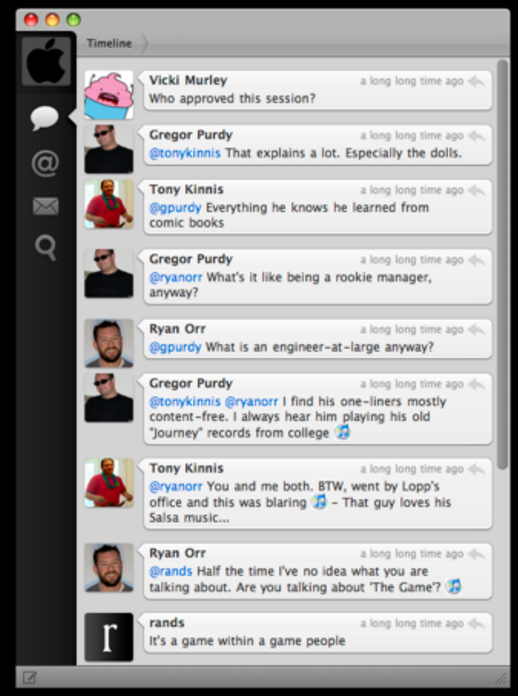
Loading Static HTML in the WebView

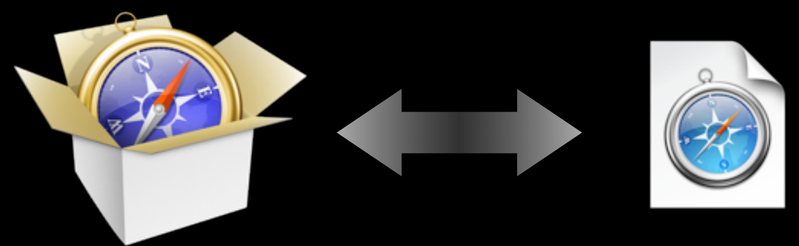
- AppController.m

```
- (void)awakeFromNib
{
    NSURLRequest * request = [NSURLRequest
        requestWithURL:[NSURL URLWithString:@"http://.../window.html"]
           cachePolicy:NSURLRequestUseProtocolCachePolicy
       timeoutInterval:60.0];
    [[webView mainFrame] loadRequest:request];
}
```

Step 2—Call JavaScript from Obj-C







Passing Objects in to JavaScript

- WebScripting informal protocol on data objects
- Pass objects in as arguments to JavaScript functions

Interface of a Simple Data Object Class

- AlbumInfo.h

```
@interface AlbumInfo : NSObject {

    NSInteger albumId;
    NSString * albumName;
    NSString * artistName;
    NSString * artworkUrl;
    NSString * primaryGenreName;

}

@property(readwrite, assign) NSInteger albumId;
@property(readwrite, retain) NSString * albumName;
@property(readwrite, retain) NSString * artistName;
@property(readwrite, retain) NSString * artworkUrl;
@property(readwrite, retain) NSString * primaryGenreName;

@end
```

Implementation

- AlbumInfo.m

```
@implementation AlbumInfo

@synthesize albumId;
...

+ (BOOL)isKeyExcludedFromWebScript:(const char *)name
{
    if (strcmp(name, "albumId") == 0) {
        return NO;
    }
...
    else {
        return YES;
    }
}

@end
```

Passing the Object in to JavaScript

- AppController.m

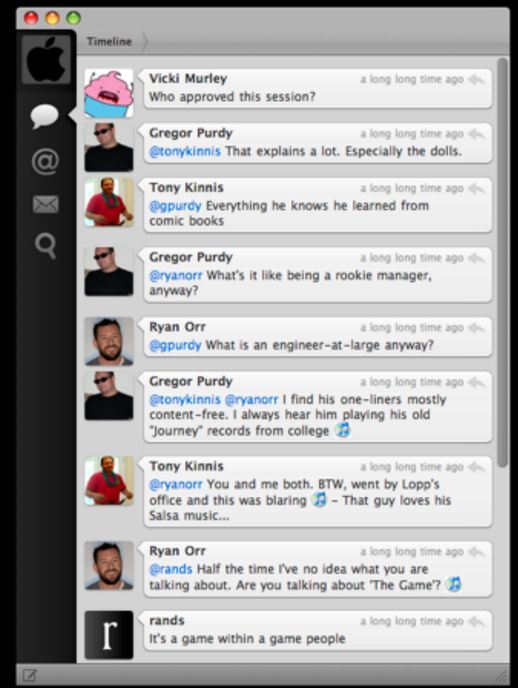
```
AlbumInfo * info = [self infoForAlbumId:albumId];

NSArray * args = [NSArray arrayWithObjects:info, nil];

WebScriptObject * ws = [webView windowScriptObject];
[ws callWebScriptMethod:@"addAlbum" withArguments:args];
```

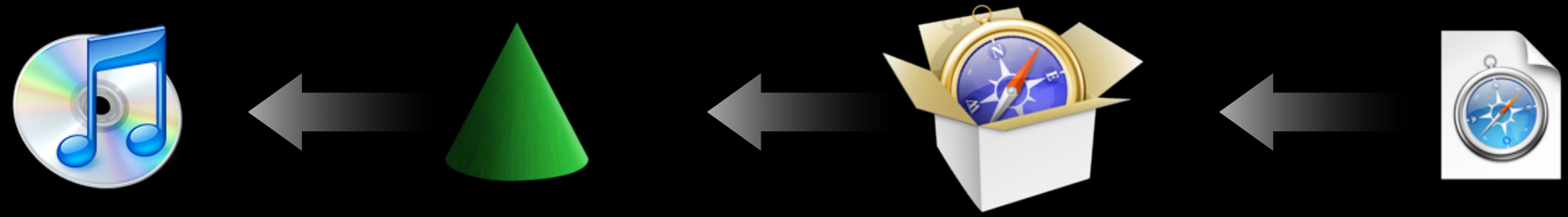
Receiving the Bridged Object in JavaScript

- window.js

```
function addAlbum(info) {
...
    var a = document.createElement("a");
    a.setAttribute('href', '');
    a.setAttribute('onclick', "viewAlbum(" + info.albumId + ")");
    a.appendChild(img);
    a.appendChild(albumSpan);
...
}
```

Step 3—Call Obj-C from JavaScript





Calling Out from JavaScript

- Write a custom object
- Register it with the WebView
- Call it from JavaScript

Writing a Bridgeable Class

- ITunes.h

```
@interface ITunes : NSObject {

}

+ (ITunes *)iTunes;

- (void)viewAlbum:(NSString *)albumId;
- (void)viewArtist:(NSString *)artistId;

@end
```

Writing a Bridgeable Class

- ITunes.m

```
- (void)viewAlbum:(NSString *)albumId
{
    NSString * openUrl = [NSString stringWithFormat:
        @"itms://.../viewAlbum?id=%@", albumId];

    [[NSWorkspace sharedWorkspace] openURL:[NSURL URLWithString:openUrl]];
}
```

Exposing the Bridgeable Method

- ITunes.m

```
+ (BOOL)isSelectorExcludedFromWebScript:(SEL)sel
{
    if (sel == @selector(viewAlbum:)) {
        return NO;
    }
    else {
        return YES;
    }
}
```

Friendly Method Names in JavaScript

- ITunes.m

```
+ (NSString *)webScriptNameForSelector:(SEL)sel
{
    if (sel == @selector(viewAlbum:)) {
        return @"viewAlbum";
    }
    else {
        return nil;
    }
}
```

Exposing the Object to JavaScript

- AppController.m

```
- (void)webView:(WebView *)sender
    didClearWindowObject:(WebScriptObject *)windowObject
    forFrame:(WebFrame *)frame
{
    WebScriptObject * ws = [webView windowScriptObject];
    [ws setValue:iTunes forKey:@"iTunes"];
}
```

Calling Bridged Methods from JavaScript

- window.js

```
function viewAlbum(id) {
    window.iTunes.viewAlbum(id);
}
```

Simple Steps to Bridging

- Expose Objective-C data objects to JavaScript
  - Pass Objective-C objects in as arguments to JavaScript functions
- Expose top-level objects to JavaScript
  - Register with the WebView
  - Call Objective-C methods from JavaScript
- Small work in Objective-C = looks native in JavaScript

WebKit for Hybrid Applications

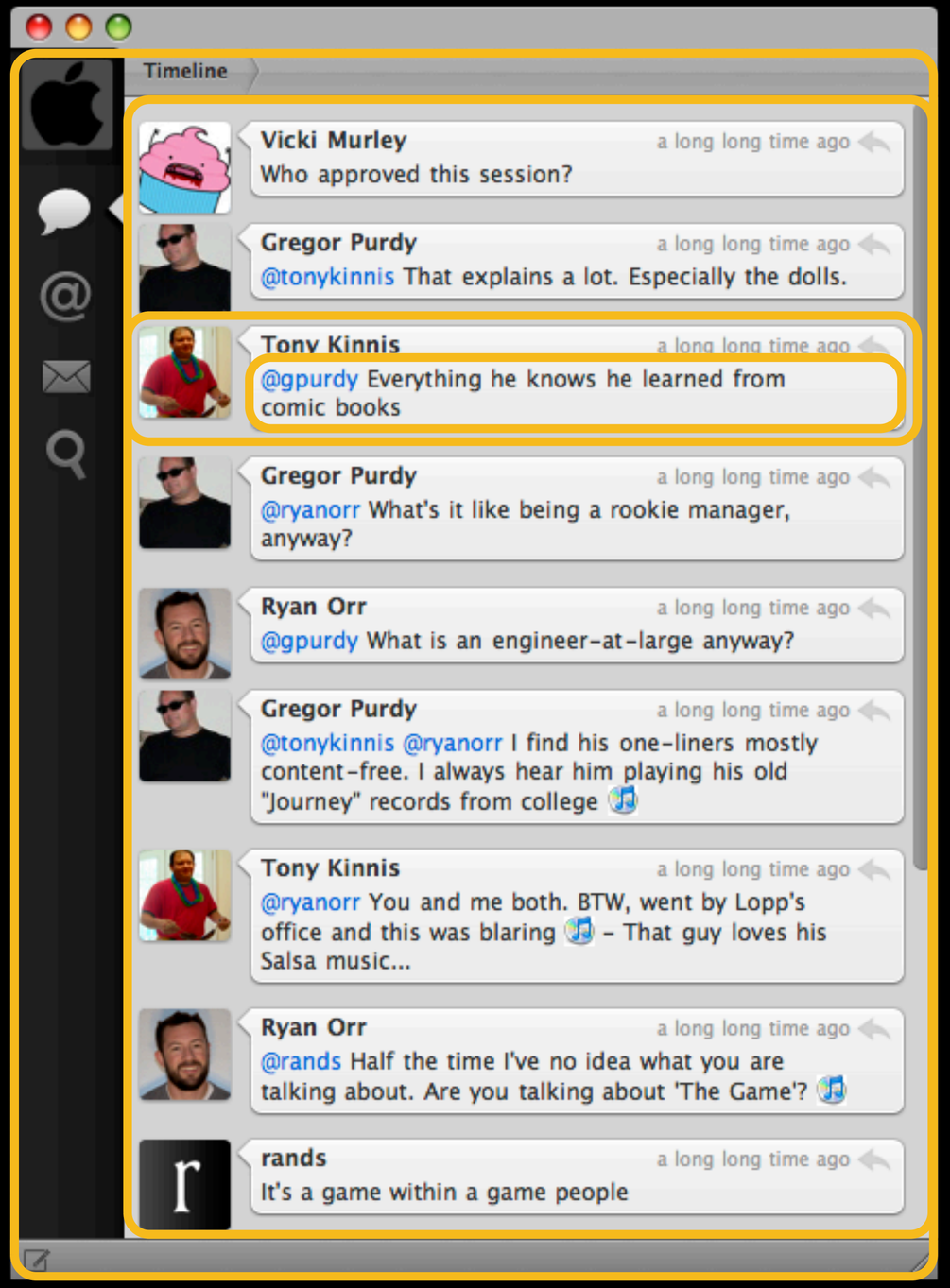
Ryan Orr
Engineering Manager

Advantages of WebKit

- Take advantage of a broader community of developers

- CSS Animations & Transitions
  - Pioneered by Apple, proposed for inclusion in CSS3 standard.
  - Don’t need direct access Core Animation

- HTML5 Media support
  - Quickly add sound and movies to your UI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a long long time ago
Who approved this session?
Gregor Purdy
a long long time ago
@tonykinnis That explains a lot. Especially the dolls.
Tony Kinnis
a long long time ago
@gpurdy Everything he knows he learned from comic books
Gregor Purdy
a long long time ago
@ryanorr What's it like being a rookie manager, anyway?
Ryan Orr
a long long time ago
@gpurdy What is an engineer-at-large anyway?
Gregor Purdy
a long long time ago
@tonykinnis @ryanorr I find his one-liners mostly content-free. I always hear him playing his old "Journey" records from college
Tony Kinnis
a long long time ago
@ryanorr You and me both. BTW, went by Lopp's office and this was blaring - That guy loves his Salsa music...
Ryan Orr
a long long time ago
@rands Half the time I've no idea what you are talking about. Are you talking about 'The Game'?
r
rands
a long long time ago
It's a game within a game people

Demo

Ryan Orr
Engineering Manager

Closing

Think Hybrid

- Mash-ups
- Commerce enabled applications
- Offline WebView

Related Sessions

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Local Data Storage and Offline Web Applications for Safari	Russian Hill Thursday 3:30PM
Safari and Webkit Overview	Russian Hill Tuesday 10:30AM

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